DOCUMENT RESUME

ED 310 978 SO 020 214

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TITLE Computerized Decision-Making Training Effects on Social Studies Lesson Planning.
PUB DATE 89
NOTE 28p.; Paper presented at the Annual Meeting of the American Educational Research Association (70th, Washington, DC, March 28, 1989).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Computer Simulation; *Decision Making Skills; Higher Education; *Lesson Plans; *Preservice Teacher Education; Role Playing; Skill Development; Social Studies; Training

ABSTRACT

While research efforts have determined that decision making is of major importance in lesson planning, there has been little work that systematically explores the effect of training in decision making on lesson planning, particularly in terms of preservice teachers. This study used four computer simulations designed to teach decision making skills in an effort to determine whether students' lesson planning ability would be affected after working through the simulations. Eighty-two students were divided into two groups: those just beginning their teacher education, who had no experience in lesson planning, and those in their senior year of study, who had some experience in lesson planning. Each student was required to write two lesson plans. Half of each group worked through the computer simulations after they wrote the first lesson plan and before they wrote the second. The two lesson plans were then compared for differences. There were nonsignificant differences in the number of characteristics found in the lesson plans of those students who used the computer simulations and those who did not. There were more characteristics in the second lesson plans of the senior students than in those of the novices. Also, those who had successfully followed the decision paths in the computer simulations had more complete lesson plans than those who were unsuccessful. These results suggest that decision making training is best utilized with advanced students. Statistical tables are included. (JB)

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COMPUTERIZED DECISION-MAKING TRAINING EFFECTS ON SOCIAL STUDIES LESSON PLANNING

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Eighty-two novice and senior level early childhood and elementary preservice teachers were involved in a study exploring the effect of decision-making training via computer simulations on social studies lesson planning. Experimental student who demonstrated ability to successfully follow the most appropriate decision tree path in computer simulation training had more complete lesson plans than did those who were less successful.

COMPUTERIZED DECISION-MAKING TRAINING EFFECTS ON SOCIAL STUDIES LESSON PLANNING

The task environment of the classroom is complex. Preservice teachers need to become aware of the many roles a teacher has. They also need to be assisted in increasing their understanding of, and skills in, planning for complex situations in a continual state of flux. Researchers have examined how teachers make decisions but little is known about how teachers have been trained to make decisions.

Research on teacher planning provides a direct view of the cognitive activities of teachers. Studies by Fogarty-Lydecker,[1] and Neale, Pace, and Case, [2] have been descriptive, focusing on the planning of experienced teachers. These studies and most other research on teacher planning have utilized various forms of self-report by teachers. Self-report forms create a methodological problem, how to elicit and interpret valid and reliable self-reports about cognitive processes. To address this problem combinations of various methods have been used to elicit self-report with some success. Ericcson and Simon[3] have found that an important variable seems to be the use of short-term memory, a teacher's comments on planning as the teacher is doing it.

Yinger found that teachers plan both content and routines[4]. Both types of planning involve making decisions about selection, organization, and sequencing. Teacher planning influences opportunities to learn,[5] content coverage,[6] sequencing of topics,[7] grouping for instruction,[8] and the general focus of classroom activities[9]. Planning shapes the broad outline of what is possible or likely to occur while teaching and is used to manage activities.

As teachers plan they make decisions constantly. These include transforming the curriculum by additions, deletions, changes in sequence and emphasis, reinterpretation and misunderstanding. Teachers also make decisions about how to allocate instructional time, whether and how to group students, whether to review content presented previously, how to organize the daily schedule, and how to meet accountability requirements. The planning process is positive for teachers, reportedly producing immediate rewards in the form of feelings of confidence and reduction of uncertainty.[10]

Shavelson has suggested that "any teaching act is the result of a decision, whether conscious or unconscious, that the teacher makes after the complex cognitive processing of available information."[11] Shulman has described the task environment of the

classroom as "more complex than that of the physician performing a diagnostic examination. This reasoning leads to the hypothesis that the basic teaching skill is decision-making."12

Since decision-making is of major importance in lesson planning it is important to explore means of increasing this ability in teachers. Most research has focused on the decision-making occurring while teachers are teaching. Some research has related to planning for teaching. There is little research, however, on the effects of interventions such as training in decision-making. This study explores the problem: "How does experience effect the decision-making processes of preservice teachers in planning lessons?" While research efforts have determined that decision-making is of major importance in lesson planning, there has been little work which systematically explored the effect of training in decision-making on lesson planning, particularly in terms of preservice teachers.

Ross has suggested that field experiences may result in an utilitarian perspective toward teaching based on trial and error rather than a thoughtful approach to teacher actions resulting from reflection on the desired classroom consequences. Ross recommends the inclusion in teacher education programs of role plays with realistic feedback allowing the preservice

teacher a degree of autonomy and responsibility with feedback that equates with professional outcomes which allow participants to evaluate their abilities. 13 A nonthreatening means of providing a role playing experience for individual students is through the use of computer decision-making simulations. In this study the effectiveness of an intensive computer decision-making experience was examined.

This study addressed the following research questions derived from the problem:

1) What are the characteristics of a social studies daily lesson plan developed by:

a.) novices who have no prior lesson planning experience?

b.) senior-level preservice early childhood and elementary teachers who have some previous lesson planning and teaching experience?

2) What are the characteristics of a second daily social studies lesson plan developed by:

a.) novice preservice early childhood and elementary teachers and

b.) senior-level preservice early childhood and elementary teachers

after they have worked with computer simulations of teaching situations and have had to make teaching decisions related to those situations?

3) Is there a difference in the characteristics of posttest lesson plans between experimental novice and senior-level preservice teachers who have worked through computer simulations of teaching situations and control group novice and senior-level teachers who have not?

4) When preservice novice and senior-level teachers have had training using a logical model of decision-making with decision trees as presented in computer simulations of teaching situations, is there a difference in the amount of details related to the teaching task in social studies lesson plans developed by those who more successfully and less successfully followed the model?

Methodology

A two-group sample (n=82) was used. The first group (n=39) included novice early childhood and elementary preservice teachers with no previous lesson planning experience. The second group (n=43) was senior-level preservice early childhood and elementary teachers with some training in lesson planning but who were not yet student teaching. The sample was drawn from two classes in an introductory junior-level class and from two classes in a senior-level elementary block of methods courses. Each group, novices and senior-level students, was randomly divided into a

control group and an experimental group. There were 20 students in the novice experimental group and 19 students in the novice control group. Twenty-two students were in the senior-level experimental group and 21 in the senior-level control group.

The task given the subjects was to write a lesson plan with sufficient details so that a substitute teacher would be able to teach the lesson in the way the writer of the plan would have. Two lesson plans were written, one as a pretest and one as a posttest. The directions for each lesson plan were the same and were given to the subjects prior to writing each plan. The directions included; the description of the content the lesson plan was to teach, the tasks which the children were to perform during the instructional sequence, and the description of the materials to be used in the lesson.

Prior to writing the first lesson plan, the pretest, the researchers agreed that the first (pretest) and second (posttest) lesson plan tasks were equivalent. Two additional judges also determined that the lesson plan tasks were equivalent.

The experimental and control groups participated in the same class activities since they were mixed throughout each class. The experimental group, in addition, worked through four computer modules prior to

writing the posttest, the second lesson plan. The pretest, writing of the first lesson plan, was administered before any instruction on lesson planning had occurred in the course. As a regular part of each course, the students received instruction in writing lesson plans and submitted a lesson plan for evaluation to the course instructor. These plans were also taught by the students during the field experience portion of the course.

The experimental group then received the treatment which consisted of working through four decision-making simulations: "Cuts," "Klepto," "Letter," and "Library" from the microcomputer software series School Transactions by Vincent N. Lunetta.14 The simulations selected required decisions on topics which, while generic in nature, went beyond the types of decisions students are required to consider in most education classes. The decisions included interacting with other faculty over a procedural policy, reacting to criticism appearing in the newspaper concerning an aspect of the curriculum, stealing in the classroom of limited learning materials needed for group work, and the failure of a student to recognize the importance of attending and participating in all classes when having difficulty with one school subject. Each student responded individually and received immediate feedback

ranging from a successful handling of the problem to the loss of the job because of poor decisions.

Students worked individually during the class period under the direction of the course instructor. Each student recorded the decision choices and a reason for each choice on a prepared answer sheet which was collected and scored. The assignment directions for the microcomputer simulations were to try to make the best choices to solve the problems presented. The most appropriate solutions resulted in a simulation which ended with a positive and pleasant response. Less appropriate solutions resulted in unpleasant actions and feelings such as the loss of the teaching job in the simulation on the part of the participant. Subjects were told to work through the decisions and record their choices until they reached a positive conclusion. They were also encouraged to work through the decision several times with different choices if they were successful on the first try so that they could see other possible consequences.

Upon completion of a simulation, students responded to a written questionnaire which asked the student to assess the degree of reality present in the simulation and to suggest specific changes which might improve the simulation. These forms were collected as

another source of data. At the end of the period a short oral debriefing was conducted.

During the next class session, the posttest (second lesson plan) was written by both the experimental and control groups. At a later date, the control group took part in the mic omputer simulations using the same procedures as the experimental group.

A scoring guide of 26 specific lesson attributes and appropriate teacher actions was established for grading the lesson plans (see Table 1). Operational definitions of the attributes were established as follows. The two researchers and two graduate students scored a subsample of six lesson plans. The scores were compared and rationales were established for awarding credit through group discussions. All the subjects' lesson plans were scored by two scorers. Then the two sets of scores for each plan were compared and discussed using criteria previously established in order to attain a minimum of 95% agreement.

Table 1 about here

Results

Characteristics of Pretest Lesson Plan. As described in Table 2, four criterion levels were set in

examining presence of a charactristic in the lesson plans written. These were presence of the characteristic in; 1) 85% or more, 2) 50% to 84%, 3) 16% to 49%, or 4) 0 % to 15% of the lesson plans. No characteristic was found in criterion level 1, 85% or more, of the novices pretest lesson plan. Among the senior level students, objectives were present, and they were behaviorally written, in 85% or more of the pretest plans.

At criterion level 2, 50% to 84%, several characteristics were found among the novices plans. Objectives, though not necessarily written in behavioral terms, were found. The plans also included the presentation of manipulatives and/or pictures. Examples of the concepts being taught were given and students were asked to identify examples of these concepts. Directions for a task assigned were given orally and students were organized into groups to carry out the task.

Senior level students also had four additional several characteristics present at the criterion level 2, 50% to 84% than did the novices. Materials to be used in the lesson were listed. Plans were made to present manipulatives and/or pictures supporting the concepts being taught to the students. Students were to be asked to identify examples of the concepts being

taught and to give their own examples and nonexamples of the concepts. Directions would be given orally for a task assigned students and they were to be organized into groups to accomplish the task. An orderly distribution of supplies was planned. A summative evaluation was planned at the end of the lesson.

Characteristics less frequently occurring and therefore at criterion level 3, 16% to 49%, in the lesson plans were greater in number among novices than among senior level students. Materials lists, a discernable introduction and an anticipator set directed at the specifics of the lesson were found at this criterion level. Also found here were plans to ask students to identify nonexamples of the concepts being taught and to give their own examples and nonexamples. This criterion level was also found in plans to announce the assignment task, and arrange for the orderly distrubution of supplies. Formative and summative evaluation of content learned were also found in 16% to 49% of the novices pretest plans.

At criterion level three, the following characteristics were found in senior level students plans; an introduction for the lesson, the use of an anticipator set, giving examples of the concepts being taught, and asking students to identify nonexamples of the concepts.

Several characteristics were found at criterion level 4, presence in 15% or less of the lesson plans. Among both novices and senior level students a set of several characteristics relating to the presentation of content were found at criterion level 4; asking students to give their own verbal definition of the concepts taught in the lesson, providing closure on each concept taught and on all the concepts taught as a group, announcing the assignment task, and providing written directions for accomplishing the task. Other characteristics related to classroom management present at criterion level 4 were; planning to observe to determine that students were completing the assignment task correctly, assigning groups locations for working, arranging for an orderly cleanup after the lesson's activities, and planning to conduct formative evaluation of content learned and of group functioning. Among novices, planning for summative evaluation was also evident at criterion level 4 whereas among the seniors the summative evaluation was at criterion level 2.

Table 2 about here

Characteristics of the Posttest Lesson Plan.

Posttest lesson plan characteristics are also

summarized on Table 2. Senior level students included more and a greater number of characteristics in their posttest lesson plans than did novice students. Novice students included objectives in 85% or more of the posttest lesson plans, criterion level 1. Senior level students included behaviorally stated objectives in 85% or more of their posttest plans. A materials list and oral directions for the assignment task were also found at criterion level 1 of the senior level students plans.

At criterion level 2, presence in 50% to 84% of the posttest lesson plans, both novice and senior students organized students into groups to carry out their assignment task. Novices also listed materials to be used in their lesson and planned to conduct a summative evaluation of the lesson. Senior level students planned to ask students to identify examples of the concepts taught during the lesson and to conduct formative evaluation of content learned while they were teaching the lesson.

At criterion level 3, presence in 16% to 49% of the posttest lesson plans, novices had more characteristics at this level than did senior students. These included; behaviorally stated objectives, introduction of the lesson, giving examples of concepts taught, asking students to identify examples and

nonexamples of concepts taught, asking students to give their own examples and nonexamples of the concepts taught, giving oral directions and providing written directions for the assignment task, arranging for orderly distribution of supplies, and conducting formative evaluation of content learned. Senior students, at criterion level 3; introduced the lesson and used an anticipator set, gave examples of concepts taught, asked students to identify nonexamples of concepts taught, asked students to give their own examples and nonexamples of concepts taught, provided written directions for the task assigned, and arranged for the orderly distribution of supplies.

At criterion level 4, presence in 15% or less of the posttest plans, a common set of characteristics was found with both novice and senior students. These included; asking students to give verbal definitions of their own for the concepts taught, providing closure on each concept taught and on all concepts taught as a whole, announcing the assignment task, assigning groups to locations for working, and arranging for cleanup after the activities, observing to determine whether the students are accomplishing the asignment task correctly and conducting formative evaluation of group functioning. Additionally, novices also planned to use

an anticipator set and ask students to give their own verbal definition of the concepts taught at this level.

Gain Scores. No significant differences were found between experimental and control students using gain scores - the difference in the number of characteristics present between the pretest and posttest lesson plans. A significant difference $F(1,81) = 5.67$, $p<.05$ was found between novice and senior level students, with senior level students having a gain score 3.28 higher than that of novices from the pretest to the posttest lesson plan. Senior level controls had a gain score 2.55 higher than did novice controls, significant $F(1,81) = 8.77$, at the $p<.005$ level.

Effect of Competence in Decision-Making Simulations. Thirty-one (73%) of the experimental students were able to successfully complete the simulations. The criterion for success was whether the student was able to make best-choice decisions and follow the most appropriate and direct decision tree path in at least 3 of the 4 simulations used. Eleven (27%) of the experimental students did not meet this criterion. Those who did meet the criterion had significantly more characteristics present in their posttest lesson plans than did those who did not meet the criterion $F(1,41) = 7.96$, $p<.005$. When those who

did not meet the criterion are removed and controls are compared with those experimentals who did meet the criterion, there is a significant difference in favor of the experimentals in numbers of characteistics present in the posttest lesson plan $F(1,70) = 8.08$, $p<.005$.

Conclusions

Nonsignificant differences were found between experimental and control students in the number of characteristics which were found in their lesson plans. Differences were found, however, indicating that more characteristics were present in the posttest lesson plans of senior students than in those of novice students. Differences were also found in the posttest lesson plans between those who more and less successfully followed the decision paths in the simulations worked through by experimental students. These findings suggest that ability to follow the decision paths may be an important factor. While most experimental students quite successfully followed the most appropriate decision path, some did not. The lack of difference found between all experimentals and controls appears to be due to the effects of those who less successfully completed the decision path. Ability to complete the decision path may be related to cognitive development in the subject. It may also

relate to level of experience in working in classrooms -- more experience may relate to greater awareness of the decisions which must be made to successfully teach.

Two factors appear to be at work. First, ability to follow the best decision path influences the number of characteristics evident in the posttest lesson plans. This may be an indication of more critical decision-making abilities, or a view of oneself as a teacher rather than a student. Second, senior level students, both experimentals and controls, show greater change from pretest to posttest lesson plan than do novices. The training seems to have less effect on novices than on more advanced students. If such training is to be utilized, it may be best used with more advanced students. Advanced students may have a more complete foundation of theory and practice on which to build. This foundation seems to be enabling them to better incorporate the benefits from the training. This research raises the question whether more extensive decision-making training would bring about better decisions in novices. Futher research with more extensive computerized decision-making training is needed. The current study utilized four training modules. A greater number of modules simulating a larger range of teaching situations may produce greater training effects.

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TABLE 1. Lesson Plan Characteristics Scored (N=26)

Objective(s) (2 items)

  Objective(s) present

  Objective(s) behaviorally written

Materials list (1 item)

Introduction (2 items)

  Introduction given

  Anticipator set indicated

Content presentation procedures (10 items)

  Manipulatives/pictures presented

  Examples of concepts given

  Students asked to identify examples of concepts

  Students asked to identify nonexamples of concepts

  Students give own examples and nonexamples of concepts

  Students give own verbal definition for each concept taught

  Closure provided on each concept taught

  Closure provided including all concepts taught

Directions for activities (3 items)

  Assignment task announced

  Assignment directions given orally

  Written directions for assignment provided

Group organization (2 items)

Students organized into groups

Groups assigned locations for working

Materials distribution (2 items)

Orderly distribution of supplies arranged

Orderly cleanup arranged

Evaluation (4 items)

Students observed to determine if assignment is carried out correctly

Formative evaluation of group functioning occurs

Formative evaluation of content learned occurs

Summative evaluation occurs

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* Each item present was scored as worth 1 point for a maximum possible total of 26 points.

Table 2
Characteristics Present in Pretest and Posttest Lesson Plans*

	Criterion Level 85-100%		Criterion Level 50-80%		Criterion Level 16-49%		Criterion Level 0-15%	
	Novices	Seniors	Novices	Seniors	Novices	Seniors	Novices	Seniors
Objective (s) present	2	1,2	1					
Objective (s) behaviorally written		1,2	1		2			
Materials list		2	2	1	1			
Introduction given					1,2	1,2		
Anticipator set indicated					1,2	1,2		
Manipulatives/pictures presented			1	1	2	2		
Examples of concepts given			1	2	2	1		
Students asked to identify examples of concepts			1	1	2	2		
Students asked to identify nonexamples of concepts						1,2	1,2	
Students give own examples and non-examples of concepts				1	1		2	2
Students give own verbal definition for each concept taught							1,2	1,2

Table 2 (Continued)
Characteristics Present in Pretest and Posttest Lesson Plans*

	Criterion Level 85-100%		Criterion Level 50-80%		Criterion Level 16-49%		Criterion Level 0-15%	
	Novices	Seniors	Novices	Seniors	Novices	Seniors	Novices	Seniors
Closure provided on each concept taught							1,2	1,2
Closure provided including all concepts taught							1,2	1,2
Assignment task announced		2			2		1	1
Assignment directions given orally							1	1
Written directions for assignment provided							1	1
Students organized into groups		1,2	1,2					
Groups assigned locations for working							1,2	1,2
Orderly distribution of supplies arranged				1	1,2	2		
Orderly cleanup arranged							1,2	1,2
Students observed to determine if assignment is carried out correctly							1,2	1,2
Formative evaluation of group functioning occurs							1,2	1,2
Formative evaluation of content learned occurs				2	2		1	1
Summative evaluation occurs				1,2			1,2	

* 1 indicates presence in pretest lesson plan
2 indicates presence in posttest lesson plan